Environmental Protection Agency

Horiba Emission Analysis System
Gas Bottle Change Procedure

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NVFEL Reference Number

011A

Implementation Approval

Original Procedure Authorized by EPCN #233 on 12-13-99

Revision Description

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1. Purpose

The purpose of this working procedure is to describe the equipment and procedure required to perform a Gas Bottle Change using the Horiba, Mexa-7000, Automotive Emission Analysis System.

Note: In all the screen displays in the procedure that have the Vol%, it should be read as Mole%.

2. Test Procedure

101 Activate the Horiba Series 7000 Bench according to WP 006, "Horiba Emission Analysis System Start-up/Shut Down."

Additional information is also available in the Horiba "Series 7000 Users Guide."

102 Perform the gas bottle change in accordance with TP 502, "Gas Cylinder Change" except in Step 118 the secondary pressure points on the regulator are checked to read 15 psi.

Note the "Named Concentration" from the tag on the gas bottle to be changed.

103 Go to the Horiba, Mexa-7000, Automotive Emission Analysis System Main Control Unit (MCU).

104 On the Command Screen title bar, click on the Horiba logo button. See the arrow in Figure 1.

From the menu that appears, click on "User Level." See the circle in Figure 1.

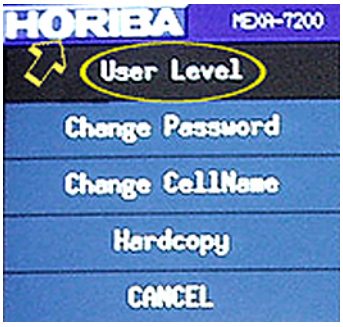


Figure 1
User Level Menu

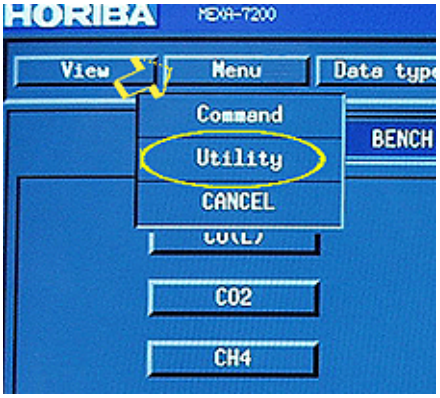
105 If “Supervisor” is not the top menu item in the display window, click on “Supervisor.” Use the mouse and on-screen keyboard to click on the letters of the password then click on “Enter”. See the arrow in Figure 2.

“Supervisor” will appear in the blue area at the top-center of the screen.

Figure 2
On-Screen Keyboard Screen

106 On the display setup portion of the screen, click on the “Menu” button. See the arrow in Figure 3. Click on “Utility.” See the circle in Figure 3.

The utility screen will appear.



.c. Figure 3
.c. Utility Screen

107 In the display area, click on the button for the analyzer type scheduled for the gas bottle change. See the arrow in figure 4.

From the menu, click on “Set span.” See the circle in Figure 4.

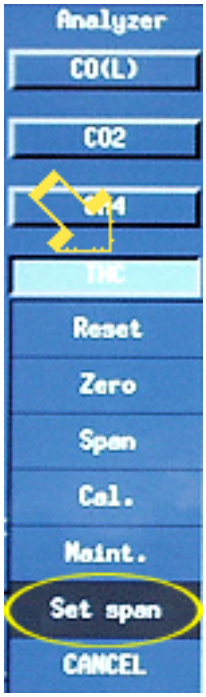


Figure 4
Select Set Span Menu

108 In the “Span gas set” menu that appears, verify that the “R1” value in yellow under “Span” agrees with the “Named Concentration” from the tag on the gas bottle to be changed in Step 102. If it is not the same, click in the field and use the on-screen keypad to enter the correct data. See the circle in Figure 5. On the Keypad, click on "OK."

On the Span gas set panel, click on “OK.” See the arrow in Figure 5.

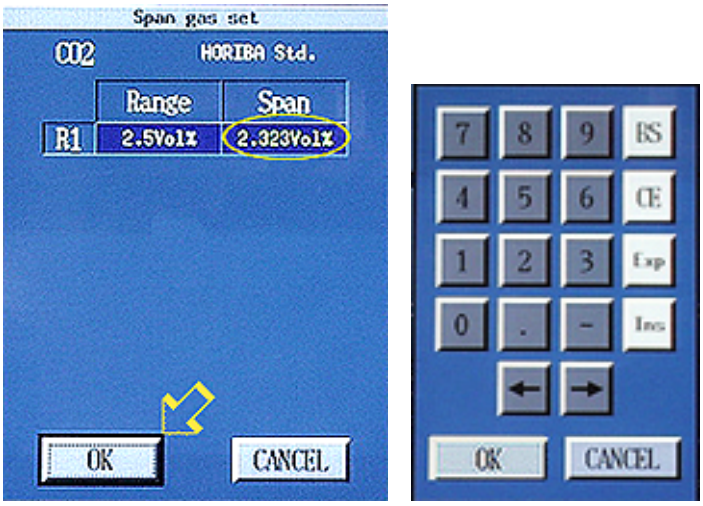


Figure 5
Span gas set Screen

109 In the screen command area, click on “Checks/tests.” See the arrow in Figure 6. Click on “Linearize check.” See the circle in Figure 6.

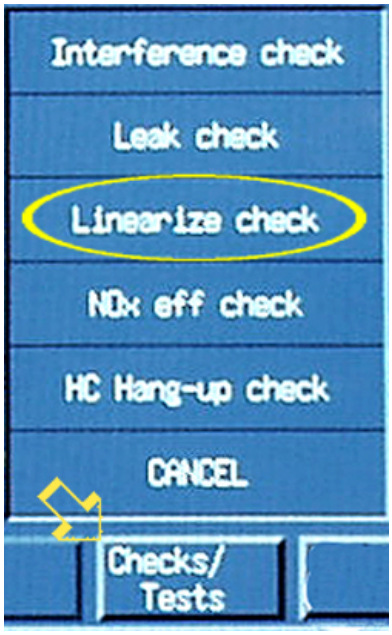


Figure 6
Linearize Check Screen

110 From the “Analyzer Linearization” menu, click on “Individual.” See the arrow in Figure 7.

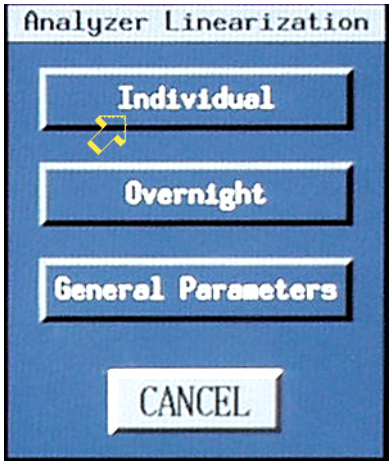


Figure 7
Analyzer Linearization Menu

111 On the "Analyzer Linearization" screen under “Analyzer Selection,” verify that the “Line” field is set to the bench that needs the bottle change and the “Component “ field indicates the correct gas. See the Circle in Figure 8.

If a correction is necessary, click on the appropriate button and select the correct data from the menu. See the Arrows in Figure 8.

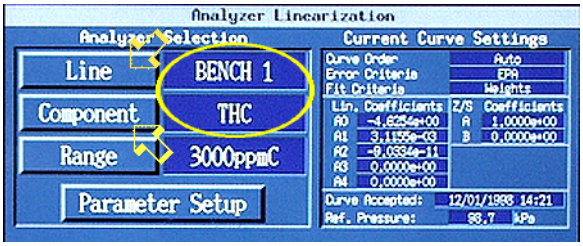


Figure 8
Analyzer Selection Screen

112 From the lower section of the “Analyzer Linearization” menu, click on “Span bottle naming.” See the arrow in Figure 9.

Figure 9
Span Bottle Naming Screen

113 The “Analyzer Calibration” screen will appear, see Figure 10. An automatic zero and span calibration of the analyzer will occur.

The indicator flashes “Z” during zero and “S” during span. The procedure will take several minutes. When the message “Calibration successfully completed” appears, click on “OK.” See the arrow in Figure 10.

The “Span bottle naming” menu will appear again.

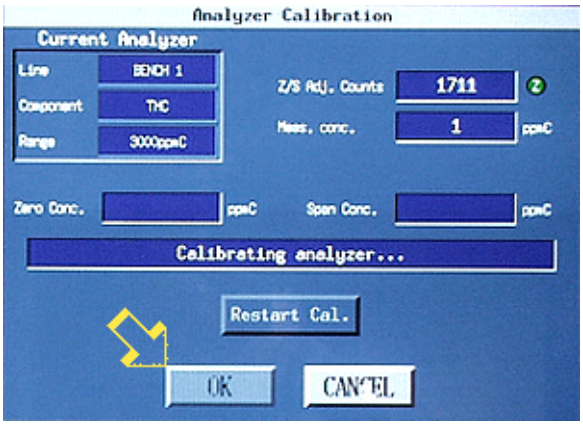


Figure 10
Analyzer Calibration Screen

114 Go to the gas cylinder storage area outside the control room and change cylinders in accordance with TP 502, “Gas Cylinder Change.” The exception to this procedure is in Step 118. For the Horiba Automotive Emission Analysis System the secondary pressure points on the regulator are checked to read 15 psi. Note the “Named Concentration” from the tag on the new gas bottle.

115 Return to the MCU. On the “Span bottle naming” menu, click in the field for “Span Gas Conc. (PPM)” and use the on-screen keypad to enter the “Named Concentration” from the tag on the new gas bottle in Step 114. See the circle in Figure 11. If the gas is HC, enter the value from the tag multiplied by three.

On the keypad, click "OK." See Figure 11.

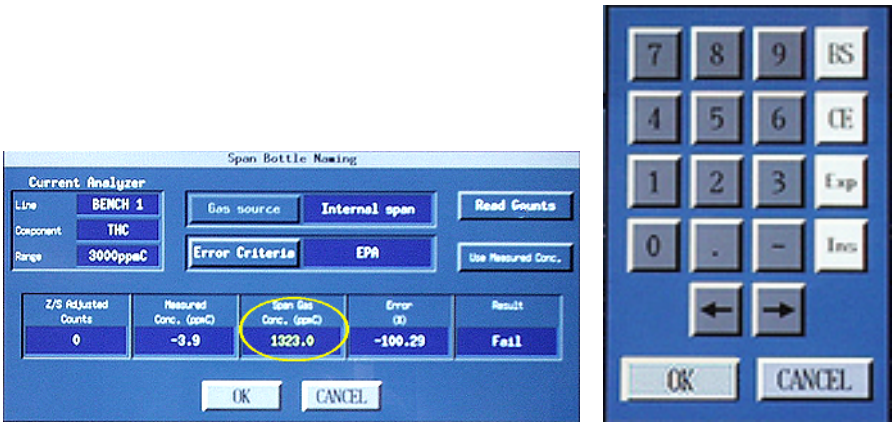


Figure 11
Named Concentration Screen

116 In the “Span bottle naming” menu, click on “Read Counts.” See the arrow in Figure 12. The “Read counts” panel will appear and the automatic read counts process will begin

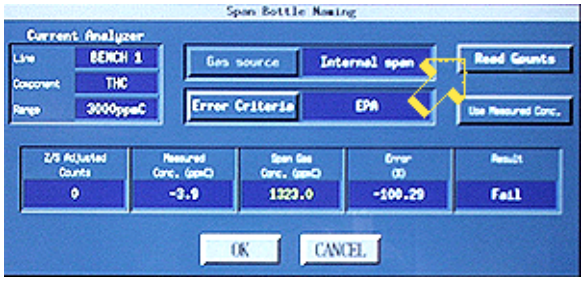


Figure 12
Read Counts Screen

117 When the “Span bottle naming” menu appears again, click on the “Read Counts” button and repeat the process a second time to ensure all gas to the analyzer is coming from the new cylinder.

118 After the process has been completed the second time, check the value in the “Error (% Pt.)" field in the “Span bottle naming” menu. See the circle in Figure 13.

The value must be within ±1%.

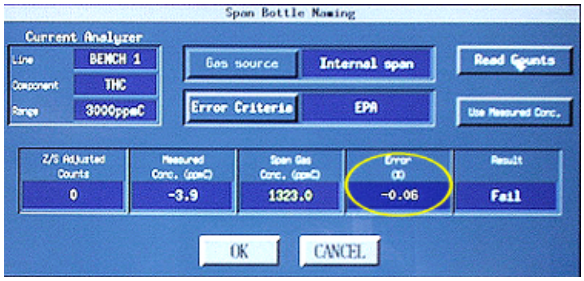


Figure 13
Error Check Screen

119 If the value is not within ±1%, repeat Steps 116 and 117 one more time.

If the value is still not within ±1%, notify the PNGV senior technician.

If the value is within ±1%, click on the Horiba logo button on the title bar. See the arrow in Figure 14. Click on “Hardcopy.”

See the circle in Figure 14.

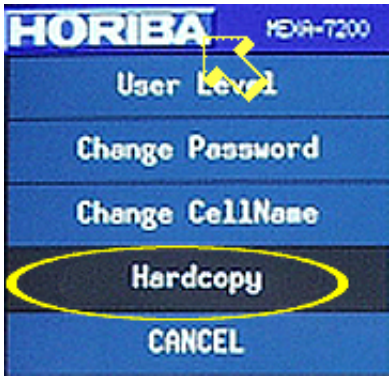


Figure 14
Select Hardcopy Screen

120 Click on “Sub-panel.” See the circle in Figure 15. When the menu panel disappears, click inside the “Span Bottle Naming” sub-panel. See the arrow in Figure 15.

A hardcopy of the sub-panel will print on the control room printer. File the print-out in the PNGV diagnostics file.

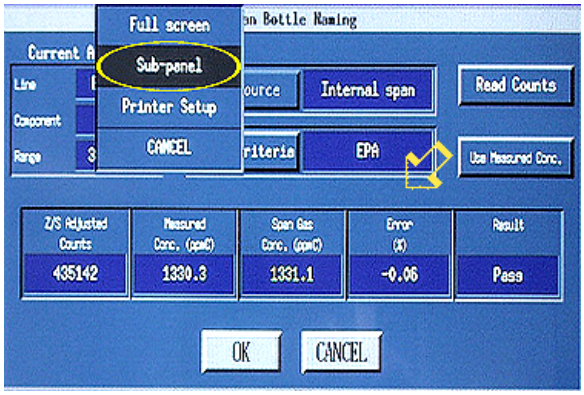


Figure 15
Select Sub-panel Selection Screen

121 On the “Span Bottle Naming” menu, click on the “Use Measured Conc.” button.

The “Span Gas Conc. ppm” field will change to the value in the “Measured Conc.(ppm) Field.”

Note the value for later reference and click on “OK.”.

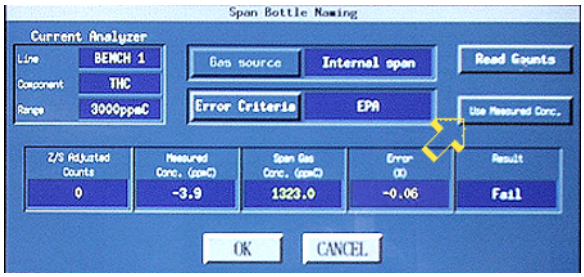


Figure 16
Select Use Measured Conc. Screen

122 On the “Analyzer Linearization” menu, click on “Cancel.” See the arrow in Figure 17. Click on “Cancel” again.

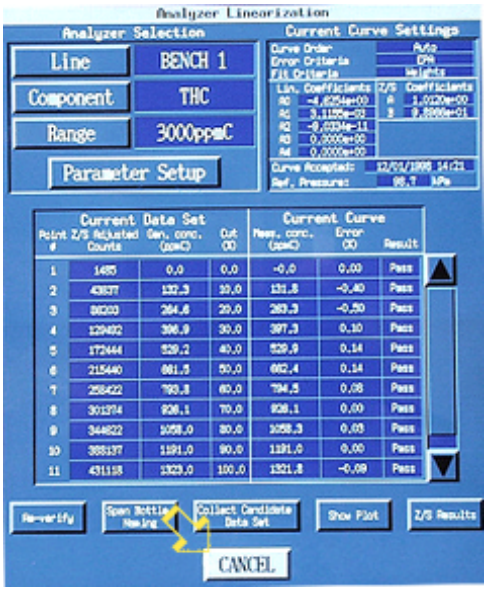


Figure 17
Select Cancel Screen

123 On the “Analyzer Linearization” Sub-panel, click on “Cancel” again. See the arrow in Figure 18.

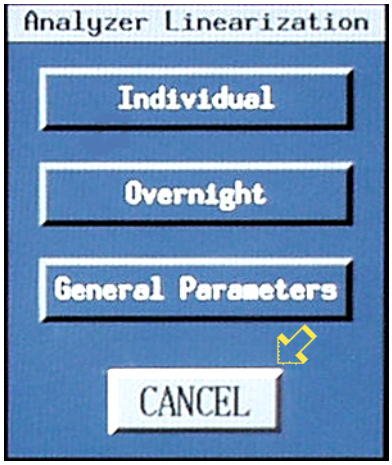


Figure 18
Cancel Analyzer Linearization Screen

124 In the display area, click on the button for the analyzer cylinder changed. See the arrow in Figure 19. Click on "Set span." See the circle in Figure 19.

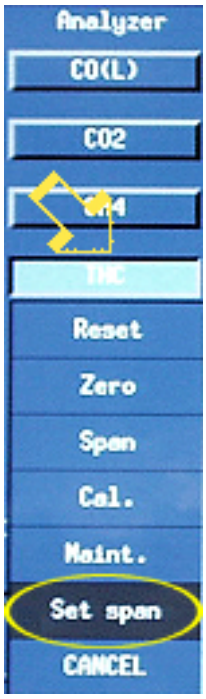


Figure 19
Select Set Span Screen

125 When the "Span gas set" menu appears, verify that the value in yellow under "Span." is the same as the value noted in Step 121. See the circle in Figure 20. If it is not, notify a PNGV senior technician and wait for instructions before proceeding, otherwise click on "OK." See the arrow in Figure 20.

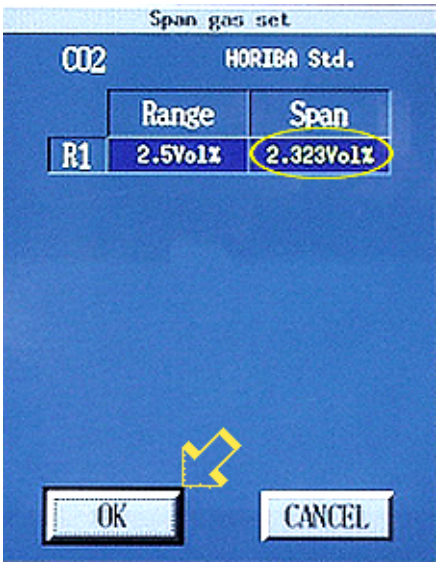


Figure 20
Verify Span Value Screen

126 On the display setup portion of the screen, click on the “Menu” button. See the arrow in Figure 21. Click on “Command.” See the circle in Figure 21.

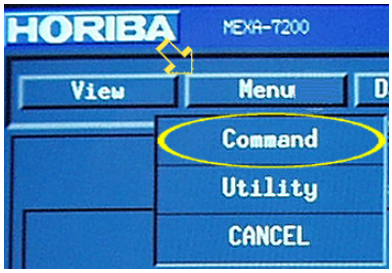


Figure 21
Select Command Screen

127 In the title bar, click on the Horiba logo button. See the arrow in Figure 22. Click on “User Level.” See the circle in Figure 22.

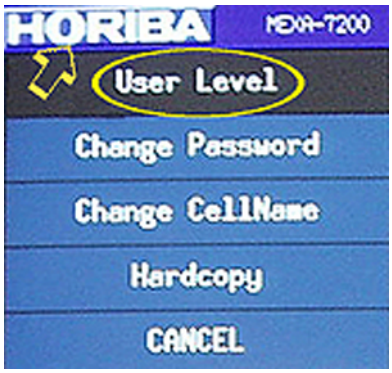


Figure 22
Select User Level Screen

128 Click on “Normal.” See the circle n Figure 23.

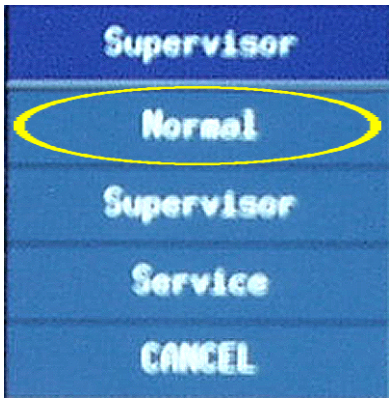


Figure 23
Select Normal Screen

129 In the basic panel display at the bottom of the screen, click on the button for the bench with the new gas bottle

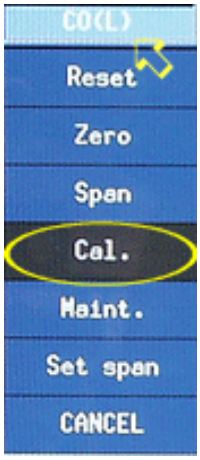


Figure 24
Select Cal Screen

130 Click on “Cal”

An automatic zero and span calibration of the analyzer will occur. A green “Z” indicator appears during zero and a blue “S” during span. The procedure will take several minutes. The calibration is completed when the indicators disappear.

131 Return the empty cylinder to the cylinder receiving and transporting area in accordance with TP 502.

3. Acceptance Criteria

3.1 The gas bottle change is performed in accordance with TP 502, “Gas Cylinder Change” except in Step 118 the secondary pressure points on the regulator are checked to read 15 psi.

3.2 A zero and span calibration must be performed prior to and after the gas bottle change.

3.3 The “Named Concentration” from the tag on the new gas bottle must be entered in the “Span bottle naming” menu. If the gas is HC, enter the value from the tag multiplied by three.

3.4 The percent of difference between the span gas concentration and the measured concentration must be within $\pm$1%.

3.5 The value displayed under "Span" on the Span gas set panel must be the same as the value displayed in the "Span Gas Conc. ppm" field on the "Span Bottle Naming" panel when the span bottle naming procedure is completed.